in 7% of the cases. It has almost completely superseded the other two races that were formerly present. Whilst able still to attack the runner types, the rust has extended its host range to the dwarf varieties which are so widely grown, hence its rapid spread.

Following upon its first determination in the coastal bean-growing areas of N.S.W. in April 1948, it appeared in collections from N.S.W. in 1949, and in late April 1949 was present, mixed with r.2, on canning beans sent from Warwick, Queensland. In February, March, and the beginning of April, collections from Queensland had yielded only r.17, and all later submissions have shown the presence of only r.17A.

The Western Australian position is also of interest. From this State Mr. W. P. Cass Smith has forwarded many collections for examination over the years. In 1944, 1945 and 1946 only races 2 and 17 were found. No further material came to hand until 1948 when only r.17 was determined. The next submission was in 1950, and this collection, as well as all the others received in 1951, show the presence of only r.17A. As a check, Mr. Cass Smith arranged for sowings to be made of dwarf varieties like "Brown Beauty" which are not usually grown in Western Australia. These became heavily rusted. Samples of this material were found to give the usual reactions for r.17A.

Changes in the physiologic races present in a particular area are well known and are a continuing problem for the plant breeder.

Specialization studies had been in progress covering the eastern and western parts of Australia over a sufficiently long period prior to the finding of r.17A to show that it appeared suddenly. The extensive cultivation of the dwarf varieties and their continued resistance until 1948 provide further evidence of this fact. Now they build up r.17A whilst screening out the other two.

It seems unlikely that uredospores of the "new" race were transported to Australia in air currents. No near source of such material is known.

There are many known cases in which hybridization in the aecidial stage has been responsible for the production of new races. It is for this reason that special efforts have been made to induce teleutospore germination of the bean rust. When this is accomplished it will be possible to determine the homozygosity or otherwise of the three races referred to herein, and to make crosses between pairs of them. It may then be found that a cross between r.2 and r.17 yields r.17A, or that it is a segregate from one of them.

Apart from hybridization of the fungi, there is evidence in the cereal rusts of mutation giving rise to new races. Some of the best examples have been found in work on the cereal rusts, Australian studies having given several instances (Waterhouse, 1952). It is possible that r.17A arose in this manner.

Morphological Aberrations.

In one plant of "Hawkesbury Wonder" and in two of "Epicure" beans, the production of three cotyledons and three primary leaves was noted (Plate xiv). Later growth was normal in each case, and the progeny were also normal.

In the last-named variety one completely albinotic plant was found (Plate xiv). After production of fully expanded primary leaves, growth slowed down, and the plant soon died.

A further unusual happening was the production of a side branch at the axil of the cotyledons in "Kentucky Wonder Hybrid 780" (Plate xiv). Inoculations with known races of rust led to the production of the same reactions on it as on the leaves of the main stem and no differences were found in the flowers and pods it produced.

Determinations of Varietal Resistance.

Varieties of beans from many sources were used in tests to determine their reactions to the three races of rust in the plant house. Wherever possible these results have been checked with field behaviour in the Sydney district.

Nomenclature has given considerable trouble. Varieties have been accessioned under the name given by the sender. In many instances the varietal name from different sources has been the same and no differences between them have been found.

But in other cases clear differences have been found, not only in regard to morphology, but also in the rust reactions given: the particular one which has been correct has often been difficult to determine. There have been many evidences of the existence of different strains of the same variety. In yet other instances there has been obvious admixture of different seeds in the one packet. Every effort has been made to check on the varietal characteristics, but there may well be cases in which the true variety was not actually represented.

The varieties have been classified on the basis of the reactions given into the following groups:

Group 1.—Susceptible to races 2, 17 and 17A.

B1225, Black Wonder, Blue Lake Hybrid 65, Blue Lake Stringless, Boston Marrow, Bountiful (Ferry Morse), Bountiful, Burbank, Burpee's Stringless Green Pod, Cecic's Epicure, Coast Pink, Corvette, Cromer, Doppelite, Drought Resistant, Dwarf Haricot (Comptesse de Chambourd), Early Pink (2 strains), Early White, Epicure (a strain), Feijao rayado, Frijol guarzo rayado, Frigoli Nigros, Fullgreen No. 1, Fullgreen, Full Measure, Great Northern (3 strains), Granda (2 strains), H4981-H1, Habilla, Harter's 181 Bountiful, Harter's 650 Pinto, Hidatsa Red, Hungarian Medal Pea, Hungarian White Hay Pea, Hungarian White Pea, Idaho Brown, Ideal Market, Katenoshi, Kentucky Wonder, Klein Weisse, Landreth, Longfellow, Masterpiece, Michelite (2 strains), Michigan, Native Bean, Navy Ottawa, Norida (2 strains), Northern Star, Norwegian, Otenashi, Pearl Sugar, Pilot (4 strains), Pink, Pinto, Poroto C.P.I. 11439, Poroto criollo, Poroto cuarenton, Poroto enana, Poroto topero, Princess of Artois, Prolific, Red Mexican (2 strains), Red Valentine (2 strains), Roger's Sensation Wonder, Roumanian White, Roumanian White Pea, Russia (3 strains), Scotia, Scott's Bluff Pinto (2 strains), Shravni Ghendi, Sixty Day, St. Fiacre, Standard Pink (2 strains), Stringless Green Pod French Bean, Stringless Green Pod (Rumsey's), Striped Bountiful, Strider, Supergreen (2 strains), Sutter Pink (2 strains), Tennessee Green Pod, Tiger, Unrivalled Wax, U.S. No. 3, Verespoor, White Imperial, Wiggins's Prolific, Yellow Eye Improved.

Group 2.—Resistant to race 2, susceptible to races 17 and 17A.

Ashley Wax, Little Navy, Michigan Robust, Morse's No. 191.

Group 3.—Resistant to races 2 and 17, susceptible to race 17A.

Ace, Alabama No. 1, Asgrow's Plentiful, B2675, Black Valentine (3 strains), Blue Lake Stringless, Brittlewax, Brown Beauty, Brown Beauty (Pugsley's Resistant), Burbank, Canadian Wonder, Clarendon Wonder (2 strains), Clarendon Wonder × Wellington Wonder, Dwarf Pencil Pod Wax, Dwarf Stringless Kidney Wax, Early Pale Dun, Early White, Ferry's Plentiful, Florida Belle (Asgrow's), Frijol Pico de Oro, Fullgreen No. 2, H49, Hawkesbury Wonder (2 strains), Idaho, Idaho Refugee, Keystonian, Low's Champion (4 strains), Logan, Long Green Stringless, Long White Marrow, Medal (4 strains), Morse's No. 65, Negro Long Pod, New York State Refugee 5, Pacer, Pencil Pod Black Wax, Pencil Pod Wax (Ferry Morse), Plentiful (Asgrow's), Poroto C.P.I. 11440, Poroto C.P.I. 11443, Pure Gold Wax Bean, Red Kidney (3 strains), Red Kidney (Geneva), Richmond Wonder, Roger's Refugee 1071 (3 strains), Roger's Sensation Refugee, Roger's Stringless Greenpod Refugee, Round Pod Kidney Wax, Staley's Surprise (2 strains), Startler Wax, Stringless Black Valentine, Stringless Green Pod (Asgrow's), Stringless Green Pod Refugee, Stringless Kidney Wax, Stringless Refugee, Tendergreen (2 strains), The Wonder (3 strains), Top Crop, Top Notch Golden Wax, Tweed Wonder (3 strains), U.S. Refugee No. 5, Wardwell Kidney Wax, Wellington Wonder (2 strains), Well's Red Kidney (2 strains), Yellow Eye, 847.

Group 4.—Susceptible to races 2 and 17, resistant to race 17A.

Corbett's Refugee, Epicure (a strain), Giant Stringless Greenpod, Rice (2 strains), Robust (2 strains), Yellow Eye Improved.

Group 5.—Susceptible to race 2, resistant to races 17 and 17A.

C.P.I. 11272, Californian Small White, Harter's 643, Meyer, Plentiful.

Group 6.—Resistant to races 2, 17 and 17A.

Cherokee Wax, Cooper Wax, Feijao, Florida Belle (3 strains), Harter's 765, Harter's 780, Harter's 814, Kentucky Wonder Brown Seeded, Lazy Wife, Little Navy, Native Bean (2 strains), Pacer, Purple Pod, Rainy River (3 strains), Resistant W.A. Kentucky Wonder, Small White, Stringless (Asgrow's), Weston, Westralia.

It is clear that the majority of the varieties tested show susceptibility to all three races. Included are all types, runner as well as dwarf types.

There are quite a number of the tested varieties which show resistance to races 2 and 17, but are susceptible to race 17A. Notable amongst these are the dwarf series of "Wonder" beans.

Most important is the group showing resistance to all three races. Outstanding is the Western Australian runner variety known as "Westralia" which has become so important as a commercial variety, not only because of its resistance, but also because of its high yield and high quality beans. It has been used most frequently as the parent in crosses with dwarf types like "Hawkesbury Wonder", from which it is expected to derive dwarf varieties resistant to rust. In a forthcoming paper it will be recorded that extensive tests have shown that "Westralia" also has resistance to all available strains of *Colletotrichum lindemuthianum*. (Sacc. and Magn.) Briosi and Cav. Thus from the crossbred material, types with the combined resistance to rust and anthracnose should become available.

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EXPLANATION OF PLATE XIV.

A, Under-surface of leaf of seedling "Tweed Wonder" bean inoculated on the left with race 17 which gives a "3" reaction and on the right with race 17A giving a "9" reaction. Nat. size.

B, Under-surface of leaf of mature plant of "Hawkesbury Wonder" bean showing natural field infection by race 17 (tiny "2" reactions) and by race 17A (large "8" reactions). Nat. size.

C, Young inoculated bean pods of "Tweed Wonder" showing heavy rust attack by race 17A and minute pustules produced by race 17. Nat. size.

D, Seedling "Epicure" bean showing 3 cotyledons and 3 primary leaves. × $\frac{2}{3}$.

E, Seedling "Epicure" beans showing albinotic seedling with normal green types. Nat. size.

F, "Kentucky Wonder Hybrid 780" seedling showing unusual production of branch from cotyledon node. × $\frac{1}{3}$.

A NEW SUB-FAMILY AND NEW GENERA AND SPECIES OF AUSTRALIAN HEMIPTERA-HETEROPTERA.

By N. C. E. Miller, F.R.E.S., F.Z.S., F.E.S.S.A., Commonwealth Institute of Entomology, London.

(*Communicated by T. G. Campbell.*)

(Eight Text-figures.)

[Read 28th October, 1953.]

Synopsis.

A subfamily, three genera and eight species of Australian micropterous Hemiptera belonging to the families Coreidae and Reduviidae are described as new.

In the family Coreidae the subfamily Agriopocorinae has been defined, it being related to, although distinct from, the Coreinae. The genus *Agriopocoris* has been erected to accommodate *A. froggatti*, *A. chadwicki*, *A. porcellus* and *A. macilentus*. A key is given to the species.

In the family Reduviidae, subfamily Harpactorinae, the monotypic genus *Austrocoranus* has been erected to accommodate *A. mundus*, and the genus *Dicranurocoris* to include three species, *D. victoriae*, *D. canberrae* and *D. tasmaniae*.

In collections received from the Division of Entomology, Commonwealth Scientific and Industrial Research Organisation, Canberra, from the South Australian Museum, Adelaide, and also from the Department of Agriculture, New South Wales, through the agency of Mr. C. E. Chadwick, were several micropterous Heteroptera belonging to the families Coreidae and Reduviidae.

Material included four new species of Coreidae and four of Reduviidae, all of which are described in this paper.

The most remarkable of these are certain species of Aradid-like Coreids found among leaf-debris on the floor of forests and under bark. Unfortunately, some of these are represented by females only, and in these cases it has been considered desirable not to name them at present; later, perhaps, more material of both sexes will be collected and then it will be possible to continue the study further. Two species of these Coreids, however, are represented by a male and a female each, another species by two males and a fourth by one male. From a detailed study of these four species, it is clear that they cannot be placed in any of the subfamilies at present recognized, and therefore a new subfamily is described below for their reception.

I am greatly indebted to Dr. W. E. China of the British Museum (Natural History), London, for his kind assistance in the genitalia preparations.

Family COREIDAE.

*Agriopocorinae, subfam. nov.

Micropterous. Antennal tubercles together about as wide as head. Orifices of metapleural glands distinct. Posterior acetabula not excised. Bucculae long, extending beyond insertion of antennae. Pro- and mesosternum sulcate. Spiracles adjacent to margin of abdomen; spiracles on segments 2 and 3 marginal; visible from above.

This new subfamily is related to the Coreinae on account of the length and position of the bucculae and distinct gland orifices. It cannot be placed therein, however, since the tibiae are not sulcate and the posterior acetabula are not excised. The shape and sculpture of the abdomen are also characters which preclude its being placed in the Coreinae or in any other subfamily. The micropterous condition of the wings unfortunately allows no comparison to be made with the venation of the Coreinae, a character which is important in diagnosis.

* *αγρίωπός* = wild-looking; *κορίς* = bug.

Agriopocoris, gen. nov.

Size small. Tuberculate. Antennae thick; basal segment shorter than head. Head about as wide as long. Rostrum extending to median coxae. Ocelli present or absent. Abdomen dorsally with rounded arcuate carinae and circular depressions. Legs short, thick; basal segment of tarsi sub-equal in length to segments 2 and 3 together. Setae short, thick, truncate apically.

Key to Agriopocoris *Species.*

1. Lateral margin of 7th abdominal segment produced; harpagones with apical portion angulate and apex long and slender 3
2. Lateral margin of 7th abdominal segment not produced; harpagones with apical portion almost straight and apex short, conical ..... *porcellus* (Fig. 3)
   Harpagones with apical portion regularly curved and apex sub-acute .. *macilentus* (Fig. 4)
3. Lateral margin of 7th abdominal segment rectangularly produced .... *froggatti* (Fig. 1)
   Lateral margin of 7th abdominal segment tuberculately produced .... *chadwicki* (Fig. 2)

Type species, *Agriopocoris froggatti.*

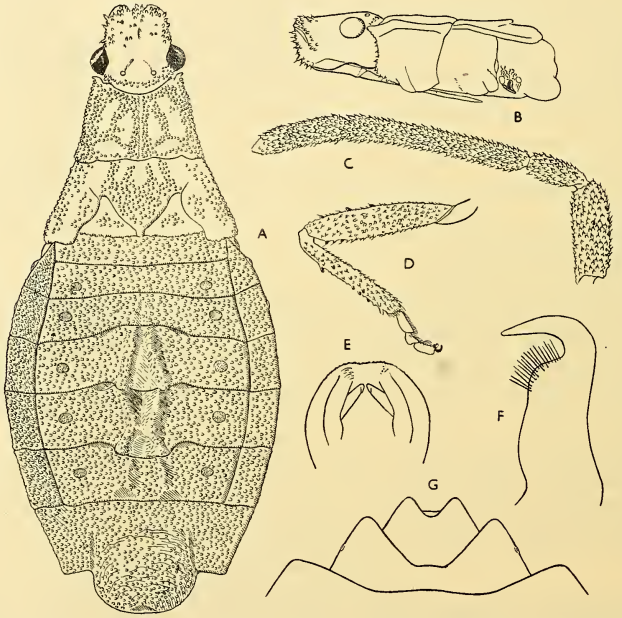


Fig. 1.—*Agriopocoris froggatti*, gen. et sp. n. A, Whole insect, dorsal view (antennae and legs omitted); B, Head and thorax, lateral view; C, Antenna; D, Anterior leg; E, Pygophore, dorsal view; F, Harpago; G, Apex of abdomen, ♀, dorsal view.

Agriopocoris froggatti, sp. nov. (Fig. 1)

Colour.—Pale ferruginous. Bucculae, rostrum, apical margin of acetabula pale stramineous; acetabula also with transverse blackish stripe adjacent to pale area. Vertex with some piceous tubercles. Apex of carinae on abdominal segments 4 and 5 blackish.

Structure.—Segment 2 of antennae half as long as segment 1; segment 3 about three times as long as 2; segment 4 twice as long as 1. Tubercles on head mainly on lateral and basal areas. Vertex with a narrow, median, longitudinal sulcus and an oblique

depression in front of each ocellus. Tylus anteriorly with moderately long tubercles. Ocellar interspace equal to width between an ocellus and an eye. Tubercles on nota conforming more or less to a pattern. Pro- and mesonotum with a median, longitudinal sulcus extending to base of produced portion of scutellum. Metanotum with projecting marginal tubercles posteriorly. Acetabula punctate. Rudimentary hemelytra concavely excised apically, extending just beyond posterior margin of metanotum. Segment 7 of abdomen rounded apically, longitudinally broadly sulcate sublaterally. Anterior and median femora with some moderately long setigerous tubercles among the low, rounded tubercles.

Total length: ♂, 10·50 mm. ♀, 12·50 mm.

1 ♂ (type), 1 ♀ (paratype), Australia; Sydney, 1895, W. W. Froggatt, in the Division of Entomology, C.S.I.R.O., Canberra, A.C.T.

The ♀ paratype is much darker in coloration than the type and in structure differs mainly in the shape of the terminal segments of the abdomen.

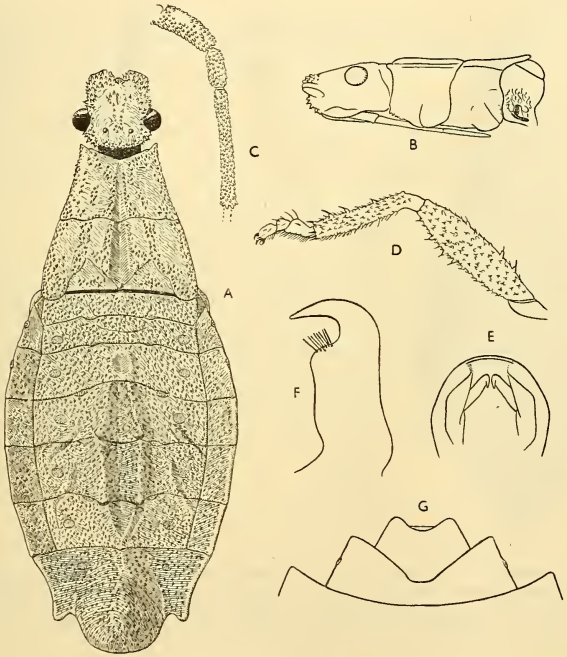


Fig. 2.—*Agriopocoris chadwicki*, sp. n. A, Whole insect, dorsal view (antennae and legs omitted); B, Head and thorax, lateral view; C, Antenna (apical segment missing); D, Anterior leg; E, Pygophore, dorsal view; F, Harpago; G, Apex of abdomen, ♀, dorsal view.

AGRIOPOCORIS CHADWICKI, sp. nov. (Fig. 2)

Colour.—Dull ferruginous. Tibiae, segment 7 of abdomen suffused with stramineous. Rostrum, bucculae, apical margin of acetabula stramineous; acetabula also with dark brown suffusion adjacent to stramineous area. Lobes of gland orifices whitish. Femora, apex of carinae on segments 4 and 5 of abdomen blackish.

Structure.—Resembles preceding species, but differs mainly in smaller size and narrower habitus, more strongly elevated carinae on segments 4 and 5 of abdomen, more

strongly elevated external apical angles of connexival segments, tuberculately produced lateral margin of segment 7 of abdomen and in genitalia of both sexes.

Total length: ♂, 10·00 mm. ♀, 11·00 mm.

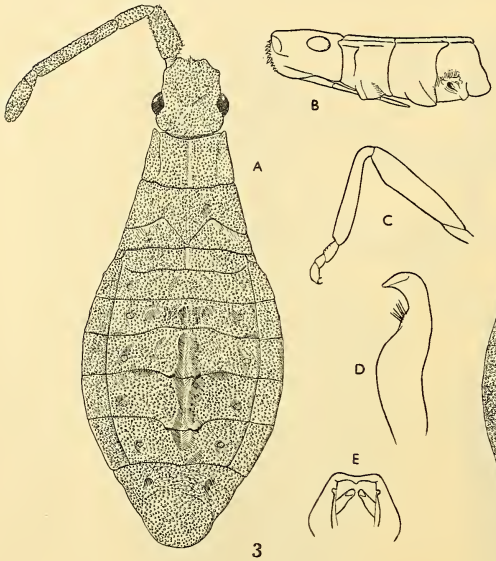
1 ♂ (type), 1 ♀ (paratype), Australia; Mt. Wanyambilli, N.S.W., 14.8.1948, C. E. Chadwick, in the Entomological Branch, Department of Agriculture, New South Wales.

The ♀ paratype is much darker in coloration.

AGRIOPOCORIS PORCELLUS, sp. nov. (Fig. 3)

Colour.—Dull ferruginous. Abdomen ventrally testaceous. Tibiae with stramineous suffusion.

Structure.—Smaller than *A. chadwicki* and differs mainly in the lateral margin of the 7th abdominal segment being almost straight and in the genitalia. The rudimentary



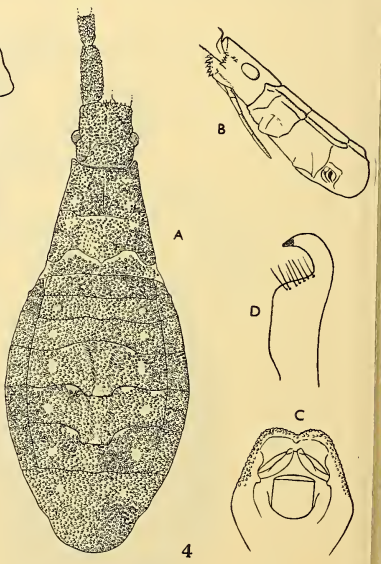


Fig. 3.—*Agriopocoris porcellus*, sp. n. A, Whole insect, dorsal view (legs omitted); B, Head and thorax, lateral view; C, Anterior leg; D, Harpago; E, Pygophore, dorsal view.

Fig. 4.—*Agriopocoris macilentus*, sp. n. A, Whole insect, dorsal view (legs omitted); B, Head and thorax, lateral view; C, Pygophore, dorsal view; D, Harpago.

hemelytra extend to the middle of the metanotum. Differs from *A. chadwicki* and *A. froggatti* in regular external margin of connexivum, the external apical angles of the segments of which are not at all elevated, and in the femora not having long tubercles.

The ocelli are lacking in this species, a condition not uncommon in entirely apterous species.

Total length: ♂, 8·30 mm.

1 ♂ (type), Australia; Southport, Queensland, 16.10.1901, W. W. Froggatt, in the Entomological Branch, Department of Agriculture, New South Wales; 1 ♂ (paratype), Southport, Queensland, 16.10.1901, W. W. Froggatt, in the British Museum (Natural History), London.